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ABSTRACT

A case study investigated the pragmatics of language classroom communication, using an analytical framework developed in an earlier study with 30 expert language teachers at the junior high school level. The case study subject was also an expert teacher. Analysis focused on the teacher's transformations of intention in language instruction, based on the immediate teaching situation, to classroom learning processes. In the study, the teacher was interviewed using a semi-directed standard protocol to obtain task-centered retrospective verbalizations, and also using a simulation protocol to obtain concurrent verbalizations. Following this, classroom interaction was observed. Verbalizations were analyzed for specific indicators, including task domains, connectors establishing pragmatic links, organizers, and concepts. The analysis of teacher transformations from intention to actualization is presented in narrative form, with examples of teacher verbalizations. A variety of transformation types was found. Implications for use of this methodology and the results are discussed. Contains 53 references. (MSE)

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DISCOURSE ANALYSIS AND INSTRUCTIONAL FLEXIBILITY: A PRAGMATIC GRAMMAR

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ABSTRACT

Intensive interviewing and observations were conducted in language classes at the junior high level, for the purpose of analyzing the flexible modules teachers use to adapt subject-matter to interactions in a communicative framework. A grammar of teacher cognitions was developed. It is composed of curricular concepts, task domains, pragmatic organizers—types of context-related intentions—and connectors. This grammar allows for the transposition of classroom activities into modular representations, and could be considered a language compiler for the language of practice. It was developed from a corpus of prospective and retrospective verbalizations with thirty expert teachers and then applied to preactive thinking and its interactive actualization within a hundred classroom observations. This article presents the transformations of intentional macropropositions in one case study with an expert language teacher. It illustrates the potential of this analytic framework. Flexibility was analyzed by comparing preactive and interactive patterns. An interview was held after class to examine postactive thinking on the reasons why changes occurred. The hermeneutic aspects of the study gave perspective to the processing of data on how objects in language acquisition move according to interactive conditions of action. This paper provides a framework for the analysis of teacher patterns of intention in language instruction.

There was a time when teachers were not meant to change their plans to fit students' interactions. Within a communicative framework in which oral language is supposed to be developing, however, adaptive teaching becomes a necessity. In this article, the words 'focal teaching' will define interactive teaching at the synchronic junction of teaching/learning (Tochon & Munby, 1993). Focal teaching represents the actual moment of teaching.

To date we are not yet in a position to build mental models of focal teaching. We have only started to shed light on some triggering conditions of pedagogical behavior. Focal teach-

ing implies parallel top-down and bottom-up processes, which seem somehow contradictory. Top-down processing of content opposes the bottom-up management of interactions. These opposed processes define the problem space of focal teaching. We can demonstrate networks of subject-matter instruction, and describe instructional cognitions (Tochon, 1991; Dionne, 1994); but providing evidence of pragmatic regulations of teaching requires sophisticated methodologies. Collins and Michalski (1989) write that cognitive psychology's methods have long been limited to percent-correct and response-time measures. Using these methods to understand processing in the teacher/learner relationships is, they suggest, like conducting a surgical operation with a hammer and chisel. More appropriate tools have to be built. This article is an attempt to explore finer grain tools. We propose a move in this direction; a first exploratory step may be to develop knowledge about pragmatic rules of knowledge transformation in teacher/learner relationships.

This methodology is based upon an analytical grammar built by Tochon (1989a). The grammar is macropropositional (Kintsch & van Dijk, 1983). Its role is to enhance our knowledge so that we may eventually be in a position to build mental models of focal teaching/learning transformations, that is, to have a description and understanding of practical intentionality for a given discipline. Macropropositions provide static descriptions of teaching dynamics.

The present case study uses this grammar of teaching domains, concepts and intentions for demonstration purposes. The pragmatic grammar that is proposed is specific to language teaching. It may be adapted for other disciplines. Even though macropropositional, the grammar is intended to bring to light contextual condition-action rules of teaching intentionality. These will, in turn, allow the elaboration of flexible default hierarchies consistent with mental models. This will be explained below.

Up to now, cognitive science has been divided into two main branches: (1) structural representations of declarative (propositional) knowledge concerned with the content and form of conceptual knowledge, and (2) rule-based goal-directed production-systems describing cognition in terms of procedural knowledge or plans and heuristic control for problem solving. A recent expansion of the second branch of cognitive science indicates the importance of contextual knowledge and situated cognitions in mental models (Holland, Holyoak, Nisbett, and Thagard, 1986; Greeno, 1989). Both branches of cognitive science may converge in the consideration of contextual intentionality within a pragmatic framework.

In the first branch of cognitive science, procedural knowledge may be represented declaratively; declarative representations are useful as instructions to control actions and can be interpreted by a compiler for execution. Such compilers are used in the ACT* production systems (Anderson, 1983, 1990). Thus complex networks of descriptive and control information may be integrated in a single declarative structure. Recent work suggests that the gap between the first branch of cognitive science and the second one is being bridged (Frederiksen & Renaud, 1990).

As teaching is a semantically complex domain, it involves two types of processes. *Top-down* processes of instruction are conditioned by *static* objects which pertain to the instructional system. They are production classes of the subject-matter, and concern domains of tasks, pragmatic organizers and connectors, as well as concepts of the curriculum. Static rules of production may be represented in propositional networks; they belong to the general system.

Such rules are defined by Frederiksen, Décarý and Emond (1990) as non-contextual and static grammar rules, compared to their dynamic conditions of action. Dynamic rules are complex and flexible representations of static rules' conditions of application. In other words, the teacher brings his/her top-down plan into the field, and is suddenly involved with a second process which relates to dynamic *bottom-up* accommodations to situations. Bottom-up processes apply to the adaptive revision and accommodation of intentions according to context. Bottom-up heuristic strategies are directed by contextual data. Both top-down and bottom-up processes involve specific types of rules: static and dynamic respectively.

In some highly parallel (non serial) systems, the static/dynamic rules opposition may overlap the distinction between diachronic and synchronic rules. Static rules involve diachronic steps of planning, whereas dynamic rules produce synchronic spreading activations according to *triggering conditions*. A triggering condition is a condition of satisfaction of a rule; particular transformations of teacher knowledge and action are triggered by particular conditions that arise in the classroom environment. For example, teacher 29 in this inquiry says that IF the students are restless and troubled, THEN he opts for the WRITING task domain. The feature {restless and troubled} may be one triggering condition for domain transformation in Language Arts. This in turn will probably condition students' knowledge transformations. As transformations are goal-directed, they reveal teachers' intentionality.

Mental models as defined here are rule-based and deal with problem solving¹. They are based on condition-action rules (IF...THEN). These basic epistemic building blocks provide the conditions of an action and the default expectations that allow that action to happen. The IF part of the rule is the triggering condition for action. Rules are clustered in categories. Rule clusters are organized into *default hierarchies*. They are ordered by default expectations based on subordinate/superordinate relations among concepts (Holland, Holyoak, Nisbett & Thagard, 1986; Dionne, 1994). Mental models have contextual flexibility; in this respect, they contrast with *schemata* or *frames*, which cannot adapt to atypical situations. Adaptive construals of mental models are explained by their default-hierarchy structures; each prototypical hierarchy of a mental model can have exception rules added to it. Exception rules adapt to situational features. For example, when one sees a cartoon with a cat barking, one does not enter it in the dog category. One creates an exception rule that makes the situation understandable. A default hierarchy integrates exception conditions of action; then it represents the variability and uncertainty that exist for any system that operates in complex situations. Mental models may give rise to different assumptions about variability when there exist alternative plausible categorizations of events. Flexibility in mental models is also explained by a high parallelism of structure. Parallel dynamic (synchronic) rules can be put into action simultaneously; dynamic relations hold atemporally between alternate descriptions of states or objects. Static rules, in contrast, represent temporal transitions between intentional states or objects. (We will not here enter the debate about plausible *static synchronic* rules in parallel systems, and about plausible *dynamic diachronic* rules in serial systems.) Parallel processes are emphasized in explorations in the structure of cognition (Rumelhart, McClelland, and the PDP Research Group, 1986).

Dynamic rules may be exception rules in a default-hierarchy, constitutive of a mental model. The way we propose to shed light on the dynamics of transformations in teachers' intentionality is to compare the anticipated statics (intentions) to the actualized statics (what has been taught). It seems possible to get information about top-down planning and compare it

with the immediate retrospective representation of its bottom-up adaptation. The move between the two processes might give indications of dynamic rules activated by the teaching/learning junction. Furthermore, the analysis of triggering conditions might result in a description of condition-action rules that govern task domain changes, pragmatic embeddings and connections. The hypothesis behind this inquiry process is that focal teaching can only be caught through an analysis of previous or immediately posterior representations.

A description follows of how the basic, static rules of the macropropositional grammar used for the study were developed. The static rules are constitutive of the grammar; their application to protocol analysis may shed light on dynamic transformational rules as demonstrated in this article's analysis. Usually, declarative cognitive frameworks isolate rule-nodes and links between semantic structures in the verbalized thoughts of people studied. But studying focal teacher thinking means being involved with actualized intentions. Thus, the pragmatic frame of intentionality may help in the discourse analysis of verbalization surrounding focal teaching. In pragmatic linguistics, for example, Fauconnier (1988) defines *starting* and *target* domains of intentions. His descriptions transcend semantics and deal with intentions or affective tacit knowledge. In this manner, language teaching is situated through pragmatic organizers. These had to be determined in a pre-inquiry phase: it was a matter of knowing what kind of task domains expert language teachers use and what kind of connectors link these domains; in short, of situating the study in light of the relevant questions developed in Tochon (1989a, 1991 and 1993a). The next section highlights the results of the pre-inquiry, which were used for corpus coding processes in the inquiry phase itself.

In this study, domains of tasks were identified by the curricular literature on these objects and their frequencies of occurrence in teachers' verbalizations (Tochon, 1991). Their relevance within the corpus was verified. Task domains are networks of organizational nodes defined within the limits of the curriculum. Vertical and horizontal links were found to exist between domains of task organization, thus confirming what had been put forward by the research literature. Task domains were codified in the grammar so their characteristic processing could be studied by identifying them systematically within the corpus.

Horizontal Processing of Domains of Tasks

Theory. The literature dealing with Language classes is based on the co-existence of four skills: oral reception (listening), written reception (reading), oral production and written production. These distinctions, especially in second languages, were endorsed by many authors to the extent that Language curricula quite often adopted it. They imply a form of non-hierarchical framing with *horizontal* links, well known to teachers.

Practice. Language-teaching requires that domains of tasks be defined. The teacher sees his or her students between five and seven hours a week, and s/he tends to divide the domains of tasks in such a manner that students will know how to get organized and will bring the necessary materials to class. The method of dividing domains usually consists of allotting one hour to oral exercises (reception/ mixed production); two hours to continuous reading (novel, etc.) alternating with two hours of composition; two hours to language techniques, spelling and grammar (work on the code); and possibly one hour to reading discussions of short texts. While

the vast majority of experts free themselves from this limited structure, they do retain flexible domains of tasks developed in a parallel and therefore horizontal relationship.

In short, both from a practical and from a theoretical point of view, it appears that basic domains of tasks of language teaching possess horizontal connections. Horizontal connectors have therefore been retained as elements of the grammar for coding. Domains of tasks most often studied by the teachers were ORAL (including speaking and listening), READING, WRITING, and Language BASICS (including verbs, words, spelling and grammar).

Vertical Organization of Knowledge

Theory. Current theories of semantic representation propose the existence of embedding among several levels of meaning, ranging from linguistic structures to conceptual frames, and including propositional relationships (Chomsky, 1981). This set of theories also sustains the existence of a vertical axis of conceptual connections.

- **Cognitive analysis of planning in writing** reveals the existence of a vertical axis in the perception of text elaboration. At one end of the axis there are letters and sounds and at the other end ideas and goals. Expression and conceptual development are located at the median point of the axis (Scardamalia and Bereiter, 1986, pp.782-787). Writing experts have control structures which allow them to pass from one level of framing to another effortlessly. This confirms the importance of vertical connections between levels in the cognitive planning of experts (Beaugrande, 1984).
- **Cognitive analysis of planning in reading** also brings out vertical types of inclusive relationships. Focus in reading is constantly being compared with a prototype of textual comprehension (Calfee and Drum, 1986), and decoding is processed through vertical connections between several levels of conceptual connections which fit together
- **The holistic nature of auditing** has been recognized as the embedding of Hearing + Listening + Cognizing (Horrworth, 1966; Pinnell & Jaggar, 1991).
- **Other types of vertical connections** could be mentioned in other sectors of the cognitive sciences (relationships between schema and script or between short- and long-term memory). At all events, a sufficient number of arguments justify coding the elements which illustrate the vertical connections between levels of embedded cognitive tasks.

Practice. Seeing that the curriculum is overloaded, teachers report that they must embed several levels of instruction by creating conceptual connections whenever possible. This means there are vertical connections between practical domains of tasks. This aspect comes out quite clearly in the corpus of the inquiry. In short, both from a theoretical and from a practical point of view, it appears justifiable to assume that vertical types of conceptual relationships exist and that they can be isolated by means of a specific coding as vertical connectors. Vertical connectors connect levels of intentional processing of contents.

Levels of Knowledge Transformation

Theory of learning. Some degree of consensus currently exists about the identification of three levels of knowledge involved in cognitive processing (Paris, Lipson and Wixson, 1983;

Schoenfeld, 1985; Marzano, Brandt, Hugues, Jones, Presseisen, Rankin, and Suhor, 1988; Winograd and Hare, 1988).

- Declarative knowledge** deals with factual data, and answers the question "What?";
- Procedural knowledge** deals with the necessary steps to accomplish a task, and answers the question "How?";
- Conditional knowledge** deals with the conditions for applying knowledge, and answers the questions "Why?", "When?", and "How to evaluate?".

Intentional control is based on activating declarative knowledge by using procedural and conditional knowledge.

Theory of teaching. Tochon (1989b and 1993a) reviewed the work of a dozen authors who had elaborated integrated taxonomies, that is, taxonomies integrating cognitive, affective and psychomotor domains. These taxonomies involve three levels of teaching knowledge which are surprisingly homogeneous:

- The first level deals with the **disciplinary content** of the subject matter;
- The second level deals with the **interdisciplinary processing** of this content;
- The third level deals with self-regulated and context-situated **transdisciplinary experience**.

Details of the comparison of these taxonomies appeared in Tochon (1989b and 1993a). The *unified taxonomy* and its theoretical use were developed in Tochon (1990a). Pragmatic, deductive and inductive approaches of different authors all corroborate these three levels, which lead us to accept this troika as a valid teaching frame. This structure corresponds with the three levels of cognitive psychology that they are intended to develop functionally. Furthermore, these categories appeared relevant in reading the corpus of the inquiry. The teaching intention of developing declarative, procedural and conditional knowledge is pragmatic; it involves cognition, affective intentions and situated actions. For these reasons, it was decided that in the corpus of the interviews the parts pertaining to these three levels of pragmatic organization must be identified. They are levels of intentional transformation. Related codes are defined below.

Tochon (1991) noted three pragmatic functions related to the three levels above: (1) The **narrative pragmatic function**, which is intended to transform declarative knowledge into stories, themes and images. This way of transmitting knowledge affectively molds it into narratives (Connelly and Clandinin, 1990; Gudmundsdottir, 1990; Shulman, 1990; Tobin, 1990). (2) The **instrumental pragmatic function**, which organizes procedural intentions in terms of skills, operations and procedures that could be transferred from one domain to another. (3) The **experiential pragmatic function**, which transforms conditional or contextual knowledge into global actions, interactions and actualized experiences. These three pragmatic functions of focal teacher thinking seem (as teachers suggested) to be ways of motivating students that were spontaneously developed in teachers' epistemology.

These functions were named in terms of knowledge organizers so as to codify their

occurrences in the corpus of inquiry. (1) The narrative organizers were named *narrativors*, as they shape curricular knowledge in narrative intentions. For example: "Imagine a terrifying and sinister haunted house and start describing its props." The study of props is introduced here through a narrative. (2) The instrumental organizers were named *skillers*, for their purpose is to *skill* students. For example: "Follow these directions regularly, and you'll get skilled in summaries". The study of summary is introduced here by requiring instrumental practice in its components to develop a skill. (3) *Actualizers* was the label for the experiential organizers molding curricular knowledge into experiential intentions. For example: "Go out on the street and question people". The study of argumentation is brought in here through a concrete experience. All three ways of transforming knowledge appear with consistency in the entire corpus. They may be embedded or sequenced through connectors. As for **connections**, there were **horizontal** links between task domains and **vertical** links between functions that could be embedded. **Alternation** connectors chronologically wove horizontal and vertical links in a rhythm of alternate patterns of connections between domains and/or functions.

Relations between different types of domains, organizers and connectors were evaluated in a corpus of some 2000 pages. Correlations between subordinate and superordinate domains were established (Tochon, 1991). For example, Language BASICS does not appear much as a target (superordinate) domain for writing, reading and oral activities. On the contrary, it is most often a subordinate domain of tasks. Individual profiles and the comparison of experts were established from computerized code patterns or sequences, and by independent variables such as school membership, age, and gender. For example, age appears quite strongly correlated to a decrease in the number of skillers (correlation: $-.392$, $p < .025$) and Language BASIC as embedded domain ($.41$, $p < .01$). Negative regression is graphically noticeable and it might be interpreted as indicating a greater ease, with age, in the use of the whole language approach. Skillers appear as the most frequent organizers of teachers' intentions in the group studied. On the other hand, actualizers are strongly correlated to oral activities as a starting domain ($.8$, $p < .005$), which is not surprising. There is a strong tendency in the group studied to sequence domains in three steps: reading \rightarrow oral \rightarrow writing, embedding pragmatic organizers of one domain into another. This result is triangulated by profile analysis and by pattern analysis, as well as by statistical code frequencies. The case analysis presented here is strengthened by a larger inquiry with 30 expert teachers.

To summarize, research was conducted within a pragmatic, semiocognitive framework (that is, one that engages with aspects of meaning that transcend the semantic). This methodology was generated by concepts of the curriculum in teachers' intentionality, their domains, their links or connectors, and their pragmatic organizers. Three levels of teachers' intentionality were identified: narrative, instrumental and experiential, respectively organized in *narrativors*, *skillers* and *actualizers*. Once the framework of research was specified, the gathering of data on intentionality transformations began.

SUBJECT

The role of experts in the definition of subject-matter is acknowledged by cognitive research. But cognition is not the sole factor in good teaching, and debate currently exists over

the nature of expertise in teaching (Berliner, 1989; Lampert and Clark, 1990). What, for example, is an expert in language teaching? Is it someone who knows recent trends in research on teaching or on linguistics? Someone who is good at teaching writing or reading or spelling? Expertise has been studied in diverse vocations (Chi, Glaser & Farr, 1988; Ericsson & Smith, 1991). Tochon (1989b) initially compared a dozen research articles on expert teachers to look for a clear operational definition of teaching expertise. It appears that there is no consensual definition of expertise in the field of research on teacher thinking. Some researchers go by recommendations; others rely on process-product correlations or filter-criteria, such as grades in teacher education, role as teacher educators, participation in creating pedagogical material. Defining an expert, who by nature should be atypical, is an inherently paradoxical activity. A generalized definition of expertise implies the kind of paradox we find in *guided autonomy and teaching for freedom*. They are crucial knots of thinking and basic paradoxes of teaching. Not only does a definition of expertise appear paradoxical; it is also tautological. As in the dilemma of whether the chicken or the egg came first, researchers on expertise must seek out experts in order to study their characteristics, without first knowing the characteristics with which to identify them.

Berliner (1989) suggests that finding good competent teachers is more realistic than looking for experts, even though exceptional people are particularly attractive. Clark (1989) lists a panoply of essential moral attributes he found in good teachers, for instance, love, care and respect. He writes that any teacher has clear harmonious moments of good teaching. The study of these *flow* moments might motivate important changes in the direction for research (Csikszentmihalyi & Rathunde, 1990). Are these good moments not more important to study than ivory tower experts?

Even though the proposed methodology is connected to a specific discipline and its static rules, it can yield insights into ways of balancing problem situations that are used by particularly good teachers. The limits of any definition of expertise being clear, a pragmatic definition of expert teachers that benefitted from many diverse criteria in expert/novice research was chosen.

A sample group of expert junior-high level language teachers was studied for the purpose of analyzing teaching pragmatics. A set of composite criteria for selecting 30 excellent teachers was established (Tochon, 1990b). These included favorable recommendations by teacher educators, academic education, professional training, minimum experience in teaching (7 years), and finally random selection.

The present article is based on one case, with one of these expert teachers. This teacher was selected among the experts in the study because he is representative of transformations in teacher intentions, and because his verbalizations provide clear examples of transformational rules underlying teaching pragmatics.

RESEARCH INSTRUMENTS

The two instruments developed for the research consisted of a semi-directed standard interview protocol to obtain task-centered, immediate retrospective verbalizations, and a simulation protocol to obtain concurrent verbalizations. The interview outline dealt with questions

raised in previous research done on expertise, planning and subject-matter-knowledge in the paradigm of teacher thinking. An example is, "What did you do when such-and-such happened?" (right after a teaching phase). The questions were related to topics in the literature reviewed. In conformity with this type of research, questions were asked to stimulate the teacher to respond initially or when discussion was saturated in one topic or range of topics. The questions dealt with specific events in the classroom or current duties (Ericsson and Simon, 1992). The simulation protocol is not reproduced here because it is not germane to the present case study.

This interview was 180 minutes long and immediately followed an observation phase in the classroom. It was recorded and transcribed *verbatim* for coding and computer analysis. Different procedures were used to demonstrate the teaching of interactive transformations. The problem was to clarify how instructional representation-frames were reorganized by interactions to discover patterns of transformations in teacher intentionality. In this regard, the methodology used in the present study might result in new ways of conceiving situated teaching among expert language teachers.

Pragmatic Grammar Used in the Analysis of Verbal Protocols

The *language of practice* (Yinger, 1986) was analyzed through a pragmatic grammar. This grammar was elaborated so as to analyze verbal protocols; only a brief overview of some grammar indicators is presented here. It sheds light on the horizontal processing of domains of tasks and on the vertical levels of knowledge processing through pragmatic connectors and organizers. To facilitate understanding, no complex language writing is used for the purpose of this demonstration.

Definition of the grammar indicators

Domains of tasks. Language domains of tasks have been defined as curricular domains most often evoked in verbal protocols. They are work spaces for teaching intentionality. These are the ORAL (speaking and listening), READING, WRITING, and Language BASICS (verbs, words, grammar and spelling) domains.

Connector. A connector establishes a pragmatic link between organizers, concepts or domains of tasks.

- (1) "Writing production will be linked with an oral inquiry."
WRITING C ORAL (inquiry)

Organizer. An organizer is a pragmatic mold shaping one or more concepts, a curricular task domain, or even an entire instructional unit. It is part of an intentional network and determines the content processing mode and the teaching intentionality. It includes the focal experience of teaching itself in virtual form.

Concepts. A concept is a conceptual node pertaining to one of the task domains of the curriculum. It is also used as a unit in propositional analysis of pragmatic networks.

- (1) *inquiry*, above.

Functions of the Grammar Indicators

Indicators of language teaching were determined by the literature and by repeated readings of the corpus. The pragmatic grammar presented in this article is new, even though its infrastructure conforms to that of semantic grammars currently being used. The examples given below in word form follow regular bracketing rules.

Vertical connector (code: /). A vertical connector establishes a conceptual link between two or more levels of framing; it determines the relationship of embedding.

- (2) "We have built actual props from the props we read about orally in this novel."
ORAL actualizer (WORK) / READING skiller (novel)

Horizontal connector (code: +). A lateral connector establishes a conceptual link between two domains. It often transfers the same organizer from one domain of tasks to another.

- (3) "We chose a theme together and worked on expressing, then reading, and then writing parts of that novel."
ORAL narrativor (theme) / skiller (ORAL + READING + WRITING)

Narrativor: story-making organizer. A narrativor is a narrative pragmatic organizer; it is intended to develop contents in the form of themes, images, anecdotes or stories.

- (4) "As a theme for writing about props, we tackled the slightly stereotyped image of the terrifying and sinister haunted house"
WRITING narrativor (props)

Skinner: skill-making organizer. A skiller is an instrumental pragmatic organizer; it is intended to develop procedural knowledge which focuses on a skill, an operation or a procedure forming a component of an action.

- (5) "Directions provide a valid reference for the summaries to be done."
WRITING skiller (summary)

Actualizer: experience-making organizer. An actualizer is an experiential pragmatic organizer; it is intended to develop contextual knowledge by focusing teaching on actions, on the relationship with concrete and everyday experiences².

- (6) "The students had the experience of questioning people on the street."
 ORAL actualizer (interviews)

To summarize, a grammar was elaborated to analyze verbal protocols taken from language teachers. This grammar is based on task domains of the discipline, pragmatic organizers involving different levels of knowledge as intentions, and connectors between domains and/or levels of tasks. Together, connectors, organizers and domains shape curriculum concepts in teaching/learning intentions.

The accuracy of the grammar was verified in a vast corpus, the results of which appear in Tochon (1991 and 1993a). The present paper illustrates how this grammar may be used to shed light on pragmatic transformations in language teaching/learning interactions. To this end, an excerpt from the corpus is analyzed, that of Teacher 29. Teacher 29 compares his planning to what happened during and after classroom interactions. He first wrote down his plan and presented it to his class. His report was verbalized in interview right after the class. He explained details during the interview. The analysis of the verbal protocol indicates modular changes; the grammar sheds light on rules used to adapt and contextualize teaching intentions to students' reactions.

EXCERPT - TEACHER 29

"I had planned to give back the grades for students' files. I also had a text with questions; as well, I had in my briefcase—you never know, just in case—two previous summaries students had written on chapters of a book. I was going to grade them but I decided not to, but instead to take these summaries back and make the students merge them into one piece of 100 words, so they could develop this abstract skill before I graded it in a normative way. So all that was in my briefcase, just in case, but I didn't think I would use it. And then I had a text about the upcoming provincial exams, with concrete examples for each point. Finally, I had a newspaper article on the evils of credit cards, to provoke debate and argument. I had all that in my briefcase and also things I had typed in a hurry, ..., just thinking, well, so I have one more text which seems pretty interesting that I could use. Things I had typed perhaps 15 minutes before class, but that had been in my mind for two-three days; that I'd been thinking about from time to time, driving the car or anywhere else.

Then I reached the classroom where the students were... very very restless, choppy and rough. In class, I opened my file to give them their grades. From the register I became aware I had given very few grades on basics. When I arrived the photocopier did not work...

In fact, what happened to these plans? I had no copies, so I could not do what I wanted with the text. Then, as far as reading was concerned, I immediately thought I could use the book reading (and have time to copy the text on the star system during the break between the two classes), but the students said: "When will we be done with *Zazie dans le Métro*?" *Zazie* usually works quite well with students with an extended vocabulary, but they have to like second-level humor. These students did not seem mature enough, they took everything at face value, which was not exciting or funny at all.

Almost everything I did emerged from the same materials; but in a completely unexpected

way. One single section that was intended to take 20 minutes took 65 minutes. On the other hand, the homework I had planned to give changed completely. I gave them spelling homework because, in the middle of the class, I remembered that it was in the provincial exam requirements. I then planned a smaller number of questions, and I organized a new bonus mark on the spot.

The results yielded by all these changes are the following. First, my students were happy because they did not have *Zazie*; they did not receive any immediate grades for dictation. Another result: students calmed down because their attention was captured by the text; and they worked hard. So, in a sense, I feel the class was successful."

ANALYSIS

Even when well planned, the beginning of any class can resemble this one. This teacher reports his intentions and their actualization in two lessons. Field contingencies and students' reactions prompted a strategic change of intentions during teaching.

The teacher came to class with a full briefcase and extensive plans. Confronted by the reality of a restless class, "choppy and rough" on the afternoon before a holiday, Teacher 29 quickly assessed the changed situation and revised his intentions. Significantly, he revealed that he knows how and when to make modifications that suit the class, yet achieve his goals for the session. To resolve the situation and obtain time to reflect, while also calming down the students, the teacher asked them to take a sheet of paper and write down the text from dictation, using their dictionaries as required. Since no dictation had been given for six weeks, and since this one "was only a pretext for looking at new words and meanings, it allowed a quieter text assimilation". He dictated a text on the topic of pop stars and youth idols, which had been planned for reading and debate (he had another text on the topic of "credit cards" in reserve).

This process of task domains and pragmatic organizers derivation can be translated as:

(7) ORAL (*reading narrativor*) → WRITING (*basic skiller*)

The text support is the same, but the modification in teaching plan seems radical. Thematic reading in view of a debate becomes simply a basic exercise, writing from dictation, with debate on that reading postponed.

In the notation above, the transformational clause is composed of two intentional phrases. The starting (subordinate) task domains appear within brackets: reading and basics. The target task domains are in capitals (ORAL, WRITING). The pragmatic organizers shaping the starting domains are included in the brackets. Bracketing denotes a vertical embedding connection. The arrow indicates a transformation from intention to actualization.

Students had been told that the grading scale for spelling dictation would be strict. When the students calmed down, Teacher 29 proposed that they exchange their copies for peer-grading, using the grading scale presented earlier and a formative evaluation grid. He considered grades as optional, and asked the students to prepare the text for the next week. The 14 questions on the text he had typed before class would be used the next week, as a "free gift" (bonus int) supplement if answers were correct.

The teacher also authorized two students to keep *Zazie*, as they were enthusiastic about it, while the others returned the book. He reported the enthusiasm generated by these extemporaneous decisions, and the dictations with peer grading resulted in two useful classes. Such initiatives were undertaken only as far as they were well-received by the students, who worked well after a choppy beginning. This teacher expressed the feeling that the smooth working atmosphere was a direct result of the spontaneous transformations of his intentions. In his teaching, he places emphasis on working with pleasure, for the students as well as for himself. He could have used the text for other purposes, as a memory challenge, as a springboard for debate after its oral reading. However, the choice seemed to have been dictated by events: he had to find a peaceful and restraining activity.

While Teacher 29 improvises, as he puts it, ideas become connected, things hang together; some events are suggested by the environment. The teacher responds to the students, joining their subjective needs to the objective needs of the curriculum.

"There is always a balance. I know I respond best to students' needs and to the program by reducing entropy, dispensing minimal energy for maximum results. Indeed, it is only on arriving in front of my students that I know how I'll use the text and how the class will follow."

The knowledge negotiation results in intentionality transformations. The transformations in the teacher intentions for these two classes were the following:

- a. The book which was to have kept the students busy for the lesson was abandoned, with the exception of two students who kept it for personal reading for two weeks;
- b. Summaries were not used for writing, but individual cases were discussed with students and then saved for a later class, just in case;
- c. Text analysis in a discussion situation did not happen, but the text on stars was used for dictation and as a peer-correcting exercise;
- d. The teacher plan for half a lesson was extended to one-and-a-half classes;
- e. Homework was modified.

Texts seem to have many uses in language, regulated by balancing the different task domains.

"If I have used too much writing, I lead the class to reading or to oral activities... A single text has several applications and can be used in many ways I have internalized through practice (but I try to innovate all along)."

Pragmatic epistemology is revealed in that process of focal intentions. Intentions formalize task domain moves, while connections between curricular nodes respond to adaptive contexts. Focal teaching transformations are evidenced in the interview of Teacher 29, when comparing his intentions to their actualization in the classroom.

| <i>Intentions</i> | <i>Actualization</i> |
|---|--|
| A. -Individual reading of the narrative on pop stars. | -Dictation spelling exercise of the text on pop stars. |
| B. -Oral answers to questions | -Practice correcting; |

| | |
|--|--|
| as an exercise. | peer-dialogue. |
| C. -Written summary exercise from two previous abstracts. | -No written summary; oral debate after reading previous abstract; individual case analysis and narrative. |
| D. -Reading of <i>Zazie dans le Métro</i> , with thinking aloud of narrative comments. | -Reading dropped; negotiation of next reading (undetermined). |
| E. -Preparation for a provincial exam using oral reading of the guidelines with the whole group. | -Individual silent reading of provincial exam field, oral explanation and narrative examples, and revision on black board. |
| F. -Answer to questions on the "stars" text for homework. | -Practice spelling based on the "stars" text for homework. |

The following paragraph is a grammar translation of the intentions above, and their actualization. This grammar notation is simplified for easy comprehension. We examined basic patterns and we did not take into account complex embeddings. For example, homework is of course a written exercise, as planned and as actualized. However, its basic intention is reading skills through text study (as planned) and spelling technical skills (as actualized). Thus, in the example of homework, the writing embedding is not mentioned. Other publications consider complex embedding (Tochon, 1991).

| Organization in <i>anticipative statics</i> | Transformation in <i>focal dynamics</i> | Organization in <i>resultant statics</i> |
|--|--|--|
| READING narrativor (stars text) | —> A —> | BASICS skiller (stars text) |
| ORAL (READING skiller(questions)) | —> B —> | ORAL (BASICS skiller(correction)) |
| WRITING (skiller(abstracts)) | —> C —> | ORAL + READING (narrativor(abstracts)) |
| READING (ORAL narrativor(<i>Zazie</i>)) | —> D —> | ORAL (actualizer(negotiate)) / READING (narrativor (undetermined)) |
| ORAL (narrativor(common test)) | —> E —> | READING (skiller(guidelines)) + ORAL (narrativor(explanations)) |
| READING (skiller(stars text)) | —> F —> | BASICS (skiller(stars text)) |

Focal dynamics of transformational functions {A to F} can be deduced from their effects on the teacher's improvisation, as explained retrospectively. An algebraic reduction of the statements above evidences the mathematical modularity of transformation rules. Intentional modules are flexibly adapted to situations.

Suppose a dynamics in which we see represented:

| | |
|-------------------------------------|---|
| T = <tasks domains> = <T1,T2,T3,T4> | R = <organizers> = <R1,R2,R3> |
| {x;y;z} = <content or material> | R1 = <narrator> |
| T1 = <READING> | R2 = <skiller> |
| T2 = <WRITING> | R3 = <actualizer> |
| T3 = <ORAL> | G = <transformationrules> = <A,B,C,D,E,F> |
| T4 = <BASICS> | |

Here is an attempt to define G(x), that is, the focal transformational function for A,B,C,D,E,F, so as to examine the pragmatic transformations of knowledge in teachers' thinking. In this functional notation, *READING narrator* ($x = \text{stars text}$) is translated R1T1(x); its focal transformation "A" for (x) is *BASICS skiller* (stars text), expressed as T4R2(x). Thus we can study regularities in focal transformations of teaching. The transformation A (x) may be rewritten as follows:

| | | | |
|--------|--------------------|---|--------------------|
| A(x) = | T1R1(x) | → | T4R2(x) |
| B(x) = | T3 T1R2(x) | → | T3 T4R2(y) |
| C(x) = | T2R2(x) | → | T3+T1(R1(x)) |
| D(x) = | T1 T3R1(x) | → | T3R3(y) T1R1(z) |
| E(x) = | T3R1(y) T1R2(x) | → | T1R2(x)+T3R1(z) |
| F(x) = | T1R2(x) | → | T4R2(x) |

Note from the algebraic formulation that conservative patterns are preserved, while focal teaching involves quite radical moves as far as pragmatic organizers, task domains and material are concerned. Most often, there is a change in one organizer or in one domain. F(x) involves a transformation where T1 becomes T4, but the R2(x) model stays unchanged. As regards A(x), both domain and organizer move: T1R1(x) becomes T4R2(x).

B(π) indicates a conservative preserved pattern while one embedded domain moves (T1 becomes T4) and the material support of teaching has been changed (x becomes y, questions become corrections). The head domain of the structure remains T3, with the same embedded organizer (R2).

The Teacher 29 excerpt illustrates elements of knowledge transformation in both students' and teachers' reactions. The grammar sheds light on some conditions and action effects of transformations as reflected in teachers' thinking. Transformations imply contextually dependent dynamic rules. Focal transformation or flow dynamics are mediated here in statics by a propositional grammar. The grammar takes the teacher's stand, but the rules which may be evidenced are basic transformational condition-action rules. Such condition-action rules affect teachers' knowledge *and* students' knowledge. See for example this excerpt from Teacher 8:

"During her writing practice, this student did not understand a mistake related to syntax. I used her (mistake) as an example, her own sentence while she was speaking about her family this morning. She will remember the rule, because she is included in my example."

The grammar structure is:

- (8) WRITING (skiller of language BASICS) —>
ORAL (narrator of language BASICS)

The transformation above will affect the student's knowledge; it describes one condition-action rule of a successful transformation of knowledge in this particular student. This is an exception based on general domain categories and pragmatic categories in a default hierarchy (Holland et al., 1986). Higher condition-action rules may explain parts of the transformation process. For example, each domain of tasks may be prototypically categorized with condition features like these ones:

- | | |
|-------------------------------------|----------------------------------|
| (9) IF class is choppy and troubled | THEN domain used will be WRITING |
| (10) IF class is lazy | THEN domain used will be ORAL |
| (11) IF it does not work | THEN switch to another domain |
| (12) IF exercise is in trouble | THEN finagle personal stories |

(The corresponding heuristic rule developed in the student by this last dynamic rule might be:

- (13) IF I've been at loose ends THEN opt for concrete life examples).

Thus there is no inconsistency in using a propositional framing so as to shed light on transformational rules that may be used, in turn, to ground pragmatic mental models. Even

prototypically planned, each situation may at any moment receive exception-rules and a specific organization according to particular events and the expression of students' reactions.

This analysis gives clear indications that teachers' intentionality is:

- a **connectional and modular**: changes occur in relation to a context, they connect and modify organizational models with **condition-action rules** activated by the environment;
- b. **indexical**: changes are made by integrating students' information and reactions in the actualized model;
- c. a **parallel processing**: it involves diachronic rules of instructional sequencing, and at the same time synchronic rules of pedagogical interaction and indexation;
- d directed by **pragmatic categories**: groups of rules circumscribing domains of tasks, level of intentions and types of connections among goals;
- e. both a **top-down** planning process involving static production rules, and a **bottom-up** actualization process involving contextually dependent dynamic rules activated by situated conditions of action.

DISCUSSION

The usual transformation in focal pragmatics, as illustrated by the verbal protocol of the teacher studied, is to change the processing task domain or the pragmatic organizer. This result was confirmed by verbal protocols of the other teachers studied. The same text would be used for READING or ORAL work, in an instrumental or in a narrative way, or it could lead to a global actualizer. It also happens that the pragmatic structure remains unchanged while the material has been criss-crossed (x becomes y, but the domains and organizers do not change). As for language teaching, this finding occupies the middle ground between the traditional and the whole language approaches (McKenna, Robinson, and Miller, 1990; Edelsky, 1990). The results obtained from experts studied in this inquiry show a practical compatibility of language-teaching paradigms.

Two dimensions of teaching that appear in the excerpt are analyzed. The first one is a static, declarative representation of instruction. We might say it represents long term memory structure and its epistemic network. The second involves dynamic, pedagogical interactions pertaining to short term memory. At a certain juncture, the expert teacher focus is such that instructional patterns are preserved while modular transformations occur.

Content is shaped through contextual constraints and its pragmatic potential is activated. Language teachers seem to process curricular nodes through intentional text materials. The way they process curriculum appears to obey at least three pragmatic functions evidenced in the corpus: narrative, instrumental, or experiential intentions (a demonstration of which appeared in Tochon, 1990a). These organizers of teaching intentionality seem to be confronted by situated transformational dynamics. Eisner (1979) states that there is a hidden curriculum, involving unexpressed aspects of the school programs. Teaching transformations might be the result of hidden organizers of the hidden curriculum, each organizational pattern of knowledge

being linked in a polar way to its complementary, unnoticed, foreshadowing disorganizing effect.

In short, the analysis shows task domain mobility and flexibility of pragmatic organization in the focal phase of actualization of intentions. Content actualization can lead to domains' derivation (oral becomes writing, reading is changed to debate, and so on). The order of items can be inverted, or modified in any number of ways. Some secondary items suddenly dominate, while important items can be abruptly dropped. Usual modes of teacher planning prescribed in teacher education are rigid compared to expert focal flexibility, which seems to maintain subjective harmony and balance, as well as meeting objective curricular needs.

Focal intentions, as verbalized by Teacher 29, appear to be energy-saving in two ways: they opt for less entropy in classroom action, and obey deep epistemic structures stored in long-term memory. Thus focal transformations consider two levels of goals: (1) long-term diachronic goals are described by static constitutive rules of the grammar; (2) short-term synchronic goals are revealed in transformational dynamics. Dynamic rules have their condition part (IF...) satisfied by environmental informations. This process is described in terms of indexation of curricular concepts (concepts adapt to students' suggestions), and in terms of level of engagement among students (it appears here, and in other parts of the corpus when teachers generally say that the teaching unit ends as a result of a decrease in students' engagement). Following is a further discussion of these two features, indexation and engagement.

Indexation and Students' Engagement

Indexation is the linking of concepts and processing domains. It gives an extended view of the curriculum throughout the year. A surface transformation might express a goal derivation in the deep epistemic structure of the year. Indexation is a form of embedding. A book's index, for example, offers references through multiple connections. As verbally reported, teacher's situated cognition seems to follow similar processes. It does not obey a sequencing from simple intentions to more complex intentions. It embeds spontaneously different levels of knowledge through indexical transformations. As verbalized, language teaching interactive pragmatics resembles a sensitive network of indexations. Each rule-node might spread at any moment in the direction of another related curricular rule-node, and change the course of the year. Even though epistemically immovable in its static structure, the teacher's curriculum appears in deconstruction-reconstruction. It is shaped by interactions on the basis of a grammar of practice. Any pedagogical focus may be the indexed turning-point towards another curricular point of the year.

The second dimension of the transformational process in teacher's intentionality is the students' level of *engagement*. Engagement is attended to if this leads to greater order and harmony. Students' engagement in the language teacher's intentionality is linked to a variability assessment. Teachers seem to assess the degree of variability quite accurately for students' engagement. Variability information about curricular engagement is used in generalizing teaching situations most suitable to producing a harmonious experience. Transformations seem to occur when turning-points are foreseen as potential increases in students' engagement, to keep pace with the deeper goals of the mental curriculum of the year.

The excerpt from Teacher 29 is an exemplar of numerous transformations. He says in

another part of the interview that "it" happened this way on this day because of persistent contextual factors (current examination in other disciplines, period of the year, previous hard work, difficulty experienced by the students in getting through the book even with effort). Surface events gave the pretext for deeply motivated transformations to appear. They were *prepared* by the previous week's environmental indications and the sudden disengagement was a triggering condition for new inferences to occur. Expert flexibility seems very different from novice unprepared improvisation. Over the entire corpus, all 30 expert language teachers gave evidence of a well-planned improvisation; this was grounded on modular patterns and the *grammar* of their discipline. Their improvisation cannot be referred to as an expression of *psychic entropy* but as some sort of flow experience (Csikszentmihalyi and Selega-Csikszentmihalyi, 1988).

The excerpt from Teacher 29 and its analysis give clear insights into a focal process that needs more validation. Biases in this exploratory study are related to short-term retrospective verbalization and to the distinctiveness of the individual studied. The gap between diachronic intentionality and synchronic interactions might be different with another teacher. Moreover, it may be different in another discipline, and at another level than junior high. Teaching styles might be different. A grammar of intentional transformations may help in differentiating and analyzing teaching styles.

The methodology proposed here would, in any case, develop interesting knowledge about basic epistemological assumptions related to teaching intentions and processing domains in a discipline. It can provide a way to analyze embeddings of pedagogical knowledge organizers in subject-matter knowledge transformations.

CONCLUSION

This article began by defining teaching in a semiocognitive perspective. We mentioned that the difference between instructional design (organization of content) and pedagogy (organization of classroom relationships to content) corresponds to two basic semiotic orientations. The axes of diachrony and synchrony are significant in the distinction between instructional design and pedagogy, respectively. In the research literature, these distinctive features are consistent with those of the double agenda of teaching. They might differentiate reflection-on-action from reflection-in-action. Thus, they give insight into a unified model of teaching.

Both aspects of the agenda have to be developed to become a good teacher. Of prime importance is the development of heuristics regulating the relations between two types of considerations: considerations about content sequencing time and considerations about pedagogical relationships. This heuristic process was named focal teaching. Teaching may be described as a dynamic function between instructional design and pedagogy, that is, respectively, long-term epistemic structures and short-term situated cognitions (Tochon & Munby, 1993).

The heuristic function of teaching defines a transformational process. It suggests knowledge transformations in the student, but also, as indicated in this article, it expresses transformations of knowledge in the teacher. Evidence was presented for a variety of transformations in the teacher's intentionality and verbalized action:

- a. Transformations in processing domains of tasks;
- b. Transformations in pragmatic organizers, that is, in the teacher's intentionality;
- c. Transformations in the way domains and organizers are connected;
- d. Transformations in the curricular concepts used as subject-matter supports;
- e. Transformation of the teacher's patterns of response according to students' reactions;
- f. Transformation of the curriculum in modular intentions indexed on students' intentions.

There was no evidence of knowledge transformations either in the teacher's long-term memory or in students' thinking, as the methodology used was not designed to obtain it. The grammar has been conceived on the basis of recurrent aspects of teachers' expressed intentions as evidenced in a corpus of 30 interviews among secondary Language Arts experts. Thus, the grammar indicators are based on long term memory, well-confirmed domains, organizers, and connectors. This methodology may be useful in other branches of learning. Furthermore, it might help develop in other disciplines:

- a. A different perspective on instructional designs, with pragmatic domains, core organizers and connectors;
- b. Patterns of practical links amongst curricular concepts giving indications for useful curricular changes or adaptation;
- c. Growing knowledge of dynamic rules relating field realities to instructional patterns. It might then in some way answer the quest for pedagogical situated cognitions and pragmatics;
- d. Indications of how teachers index curricular knowledge to the needs and reactions of students; these indications might inform action research in teacher education and field reflective practice;
- e. Pragmatic grammars basic for tutorial intelligent systems providing field simulations(both computational teaching systems and teacher educating systems). Reflective practice in a simulated environment might develop plausible answers to field problems. As far as teacher education is concerned, this last possibility should only be envisaged with caution: one must consider the limitations of micro-teaching in simulated settings. Probably nothing replaces real student teaching and reflective teaching itself for the experiential development of situated cognitions. The well-planned improvisation of a really good teacher is a spontaneous heuristic process in answer to idiosyncratic contexts. We might understand it but not mimic it (Lampert and Clark, 1990).

This article provides indications that focal teaching is tightly shaped by modular connections between task domains and pragmatic organizers. A teacher's way of knowing expresses itself in intentional transformations which can be demonstrated by a pragmatic grammar. The grammar, in turn, might express the middle ground between prescription and rationalization (Floden and Klinzing, 1990), with its rules, its mobility of modelling, and its exceptions. In accordance with our research results, the expert teacher is the one who has spent a lot of time to

elaborate accurate planning; who has at his or her hand a large bank of plans; and who expresses a manifold planning in a variety of adaptive intentional modules fitting students' engagement as closely as possible.

Teacher 29: "Text has one purpose. But I should say that most of the time I do not know how I will use text before coming into class. Here, there was such enthusiasm in the interaction with pupils after I decided to change, and with peer-correction (they liked it). It was a lively and almost joyful event, with a comparison exercise amongst them. Eventually things worked smoothly.

When I reflect on that lesson, I notice great modifications in my plans. And most of the modifications are probably due, on one hand, to the way I use text and planning, ie, my processing mode; and, on the other hand, to the time that things take. There, for example, I had planned lots of questions, and I could not touch half of them. The bell had rung. I constantly have to change the pace of action."

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NOTES

¹The option of mental models taken by Holland, Holyoak, Nisbett & Thagard (1986) seems quite suitable to the present analysis. It implies pragmatic reasoning processes (Cheng and Holyoak, 1985).

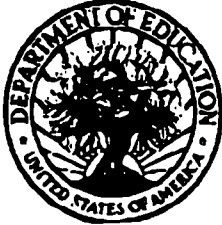
²Narratives of experiences (Connelly & Clandinin, 1988), which appear frequently in the corpus, are abbreviated narrativor (X) / actualizer (Y) insofar as they draw a student close to an actual experience or a personal feeling; in these cases, an actualizer is embedded in a narrativor. However, an actualizer at Level One clearly has more experiential power than when it is embedded in a narrativor at Level Two.

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